INDEX TO CLAUSES

EI.01.0 GENERAL

EI.01.01 The workmanship, installation, and testing of the lightning protection system shall conform in all respects with BS EN 62305:2006.

EI.02.0 EXPOSED AIR TERMINATION NETWORKS

EI.02.01 The air termination network shall consist of either aluminium or copper material with a minimum cross section area of 50mm², and may consist of vertical or horizontal conductors or combinations of both as located and indicated on the drawings and in Section EL of the Specification Document.

EI.03.0 CONCEALED AIR TERMINATION NETWORKS

EI.03.01 The air termination network at the roof ridge shall consist of solid metallic conductors, aluminium or copper of minimum cross sectional area of 50mm², and shall be concealed within the roof void underneath the roofing felt and securely fixed every 100mm.

EI.03.02 Air finials at the ridge position shall be a minimum size of 10mm diameter located at distances recommended by BS EN 62305:2006 and project above the crest/ridge tile by a distance of not less than 300mm. They shall be fixed with an appropriate terminal base and pass through the crest/ridge tile at the appropriate point and to connect the general network within the roof space.

EI.03.03 Where penetration of the crest/ridge tile takes place, permanent and effective waterproofing shall be made with a silicon mastic or equivalent material.

EI.03.04 Air terminals at the eaves position shall be 55mm x 55mm square tape clamps, of the correct material to match the air termination network, fixed to the external face of the roof material by means of a cavity fixing bolt (e.g. rawlnut 5250).

EI.03.05 Alternatively, if a metal (i.e. aluminium) perimeter roof gutter is to be installed by the Main Contractor, then this may be used to form the strike point at the eaves position. If the metal gutter is to be used in this way then the Lightning Protection Installer must ensure that it is effectively bonded at all connection points.

Cont'd

EI.03.0 CONCEALED AIR TERMINATION NETWORKS (Cont'd)

EI.03.06 Where indicated, metal framed or metal clad roofs or metal copings, which form part, or all of an air termination, shall be bonded across joints between constituent parts. The bonding may be carried out by the specialist roofing contractor but where this is not the case the bonds shall be made as indicated; no drilling of roofing or coping shall be done without the approval of the Contract Administrator.

EI.03.07 Metalwork of structures, chimneys, pipes, cowlings, plant, walkways, handrails and similar components of the building that are exposed at or above roof level shall be bonded to the nearest air termination.

EI.03.08 Where a signal aerial is mounted on the structure it shall be protected as bonded to the nearest cross tape.

EI.04.0 DOWN CONDUCTORS

EI.04.01 The type and location of down conductors shall be as indicated on the Contract Drawings. No aluminium conductor shall be buried in the ground.

EI.04.02 Down conductors shall be of aluminium or copper, strip or rod of minimum cross sectional area 50mm² and where installed externally shall be provided with a PVC sheath, the colour of which shall match the finish of the building.

EI.04.03 Where the down conductors are to be dropped internally they shall be enclosed in a suitable void or duct, which shall be provided by the Main Contractor.

EI.04.04 The exact fixing method of all down conductors shall be stated in Part EL of the Specification Document.

EI.04.05 The appropriate size, colour and type of fixing clip shall be used and all down tapes shall be so positioned as to form a neat appearance.

EI.04.06 Where a copper air termination network is utilised, the down conductor shall be terminated in a test clamp, located 500mm above the external damp proof course, the final connection to the earth rod being made in sheathed copper tape of 50mm² minimum cross sectional area.

EI.04.07 Where an aluminium air termination network is utilised, the down conductor shall be terminated in a bimetallic connector with test clamp fitted below, located 500mm above the external damp proof course, the final connection to the earth rod being made in sheathed copper tape of 50mm² minimum cross sectional area.

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EI.04.0 DOWN CONDUCTORS (Cont'd)

EI.04.08 Where the profile of the building would cause an overhang or re-entrant loop to be formed in a down conductor the Contract Administrator shall be informed.

EI.04.09 Where the reinforcement of a concrete structure forms the down conductors, welding of the reinforcement will be carried out by the Main Contractor, but the Electrical Services Installer shall carry out all testing to ensure acceptability in accordance with BS EN 62305:2006.

EI.04.10 Connections from down conductors formed by reinforcing steel or concrete clad steel frames shall be made by the Main Contractor. They shall comprise stainless steel tape, not less than 20mm x 3mm, welded onto the steelwork. The Main Contractor shall agree with the Contract Administrator the length of tail to be left for subsequent connection.

EI.04.11 Screws and rivets shall be of the following materials:

a. for copper conductors, phosphor bronze, naval brass or high-tensile manganese brass.
b. for aluminium conductors, stainless steel.

EI.05.0 JOINTS

EI.05.01 Joints in conductors shall be kept to a minimum.

EI.05.02 All contact surfaces shall be thoroughly cleaned and coated with an anti-corrosive electrical jointing compound suitable for the conductor material. For bi-metallic joints a separate abrasive shall be used to clean each metal.

EI.05.03 Joints between conductors of the same metal, other than at test points, shall be made by the termit welding process or by riveting and sweating. Overlap of conductors shall be not less than 100mm.

EI.05.04 Where and aluminium conductor is jointed to a copper conductor, one of the following methods shall be used.

a. a bi-metal connector formed by friction welding high purity copper and aluminium.
b. the copper conductor shall be completely sheathed for at least 100mm of its length with metal strip electrolytically compatible with copper and aluminium, and then clamped to the aluminium conductor.

EI.05.05 Bi-metal joints shall not be made at test points or between the test point and earth electrode.

EI.06.0 EARTH ELECTRODES

EI.06.01 Earth electrodes shall consist of 16mm diameter copper bonded rods with appropriate couplings, if required, and be in accordance with BS EN 62305:2006.

EI.06.02 The top of each earth electrode shall be housed in a concrete pit to facilitate inspection and be complete with lid and installed flush with the finished ground level. The concrete pits are to be handed to the Main Contractor at an appropriate time who will locate the units and ensure that they are firmly fixed in the ground by surrounding it with concrete and aggregate mixture.

EI.06.03 Where more than one earth rod per down conductor has to be installed, then they shall be, where practical, equally spaced in a line parallel to the structure at horizontal distances equal to the length of the rods or 3600mm which ever is the greater.

EI.07.0 EXTRANEOUS METALWORK

EI.07.01 Where extraneous metalwork occurs, it will be securely bonded to the air termination network with appropriate conductors and clamps

EI.07.02 Metalwork on or in the structure, which is within the recommended safe distance as defined in BS EN 62305:2006, shall be bonded to the lightning protection system using appropriate conductors and clamps.

EI.08.0 CROSS BONDING

EI.08.01 Where a service belongs to a Public Statutory Undertaker the permission of the Undertaker shall be obtained before connection is made.

EI.08.02 The lightning protection system shall be bonded to the main earth terminal of the electrical installation with an 8mm diameter copper rod, or similar sized stranded cable, at the nearest down conductor, above the test clamp and shall be labelled as BS 7671: 2008, Requirements for Electrical Installations Wiring Regulations Seventeenth Edition except that the wording shall be: -

"SAFETY BONDING CONNECTION, LIGHTNING PROTECTION SYSTEM"

EI.09.0 LIFT INSTALLATION METALWORK

EI.09.01 Lift installation metalwork, together with all extended metalwork on the inside and outside of the lift shaft, including ladders and handrails should be bonded to the lightning protection system and to any adjacent structural steel work not only at the top and bottom of the lift shaft but at regular vertical intervals not exceeding 20m.

EI.10.0 TEST JOINTS

EI.10.01 A mechanical test clamp, of the circular screw down type, shall be provided in each down conductor; it shall be located 1m above ground level unless otherwise indicated. Test clamps shall be of cast gunmetal.

EI.11.0 TEST RESULTS

EI.11.01 A test certificate, including a drawing showing the location of the earth electrodes numbered in sequence, indicating the resistance of each electrode shall be provided to the Contract Administrator.